

CLAIMS

What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A power supply apparatus, comprising:

a plurality of power source circuits with a common direct current power source;

an oscillator circuit which generates a plurality of oscillator signals; and

a controller which performs a time sharing control based on the plurality of oscillator signals to enable the plurality of power source circuits to receive power from the common direct current power source in different timings.

2. The power supply apparatus according to claim 1,

wherein the respective voltages are different from each other.

3. The power supply apparatus according to claim 2, further comprising:

a selection circuit, selecting at least two power source circuits out of the plurality of power source circuits,

wherein the controller performs the time sharing control to enable the selected at least two power source circuits to receive power from the common direct current power source based on the plurality of oscillator signals.

4. The power supply apparatus according to claim 3,

wherein the plurality of power source circuits include a voltage-step-up circuit, a voltage-step-down circuit, and a multiplicative voltage-step-up circuit, wherein

the selection circuit selects one of a combination of the voltage-step-up and voltage-step-down circuits and the voltage-step-down and multiplicative voltage-step-up circuits, and wherein

the controller performs the time sharing control based on the plurality of oscillator signals to enable one of the combination of the voltage-step-up and voltage-step-down circuits and the voltage-step-down and multiplicative voltage-step-up circuits

selected by the selection circuit to receive power from the common direct current power source, and

wherein the voltage step-down circuit receives power from the common direct current power source with a substantially identical timing when either one of the combinations is selected.

5. A power supply apparatus, comprising:

a plurality of power generating means for generating a plurality of different output powers based on a common direct current power source;

oscillating means for generating a plurality of oscillator signals; and

controlling means for performing a time sharing control based on the plurality of oscillator signals to enable the plurality of power generating means to receive power from the common direct current power source in different timings and to output respective voltages.

6. The power supply apparatus according to claim 5,

wherein the respective voltages are different from each other.

7. The power supply apparatus according to claim 6, further comprising:

selecting means for selecting at least two power generating means out of the plurality of power generating means,

wherein the controlling means performs the time sharing control to enable the selected at least two power generating means to receive power from the common direct current power source based on the plurality of oscillator signals.

8. The power supply apparatus according to claim 7,

wherein the plurality of power generating means include voltage-step-up means for generating a step-up voltage, voltage-step-down means for generating a step-down voltage, and multiplicative voltage-step-up means for generating a multiplicative step-up voltage, wherein

the selecting means selects one of a combination of the voltage-step-up and voltage-step-down means, and the voltage-step-down and multiplicative voltage-step-up means, and wherein

the controlling means performs the time sharing control based on the plurality of oscillator signals to enable one of the combination of the voltage-step-up and voltage-step-down means and the voltage-step-down and multiplicative voltage-step-up means selected by the selecting means to receive power from the common direct current power source in different timings and to output respective voltages, and

wherein the voltage step-down means receives power from the common direct current power source with a substantially identical timing when either one of the combinations is selected.

9. A power supply method, comprising the steps of:

providing a plurality of power source circuits with a common direct current power source;

generating a plurality of oscillator signals, and

performing a time sharing control based on the plurality of oscillator signals to enable the plurality of power source circuits to receive power from the common direct current power source under different timings.

10. The power supply method according to claim 9,

wherein the respective voltages are different from each other.
11. The power supply method according to claim 10, further comprising the steps of:

selecting at least two power source circuits out of the plurality of power source circuits,

wherein a controlling step performs the time sharing control based on the plurality of oscillator signals to enable the selected at least two power source circuits to receive power from the common direct current power source in different timings.
12. The power supply method according to claim 11,

wherein the plurality of power source circuits include a voltage-step-up circuit, a voltage-step-down circuit, and a multiplicative voltage-step-up circuit, and wherein

the selecting step selects one of a combination of the voltage-step-up and voltage-step-down circuits, and the voltage-step-down and multiplicative voltage-step-up circuits, and wherein

the performing step performs the time sharing control based on the oscillator signals to enable one of the combination of the voltage-step-up and voltage-step-down circuits, and the voltage-step-down and multiplicative voltage-step-up circuits, selected by the selecting step, to receive power from the common direct current power source in different timings and to output respective voltages, and

wherein the voltage step-down circuit receives power from the common direct current power source with a substantially identical timing when either one of the combinations is selected.